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WMU Pipeline

Water Management Unit

- In-season Nitrogen Management using Remote Sensing
- Making the best use of a limited irrigation water supply
- Precision Weed Management-Herbicide Degradation

Precision Agriculture Field Day

Precision Agriculture Field day was held at Larson Farm, Gill, Colorado on Aug. 3rd, 2005. It focused on presentations of current ag. research, equipment, and computer resources available to producers. Specific topics included: Management of nutrients on management zones, in-season N management using remote sensing; Spatial weed distribution and management, precision weed management: herbicide degradation; Farming on the computer: GPFARM and iFARM; Precision Ag. CO Corn Growers; and a presentation on the CSU degree program in applied information technology in agriculture.

Government agencies were well represented along with members of ag. industry and the farming community. Next year we hope to see more faces from the farming community.

The field day was jointly sponsored by Colorado Corn Growers, CSU Cooperative Extension, Ag Experiment Station, US Environmental Protection Agency, Western Sustainable Research and Educations Grant, and USDA-Western Region Risk Education Grant.

Highlights…

Topics presented…

"Remote sensing technology makes it possible to save money and develop better quality crops."

"Precision Agriculture will hold an important part of any kind of farming system in the future."

For full presentations a link is located on the end of web page.

In-season Nitrogen Management using Remote Sensing (Walter C. Bausch)

The objective of this study is to use remote sensing techniques to assess the N status of the crop for applying N when and where it is needed. Past studies such as one in the Wiggins, CO area on irrigated corn indicated that less N cost was required to produce the same crop yield and there was less N in the root zones for potential leaching. Current studies are being held in Ft. Collins (ARDEC) and Yuma.

Making the best use of a limited irrigation water supply (Gerald W. Buchleiter)

Greater competition for limited water supplies

Droughts over the past several years have reduced water supply for irrigated agriculture and created greater competition for limited water. In a recent USGS survey, the nitrate level in drinking water has increased and atrazine also was detected. This means that the use of water in irrigated agriculture has to be more efficient and at the same time decrease water quality degradation.

Irrigation with a limited water supply

An irrigation study is on going at Colorado State University's ARDEC in Fort Collins. This research will provide information for the development of recommendations fort how to change crops, cropping systems, irrigation methods and strategies, in order to maximize crop production for water supplies ranging from rain fed to full irrigation.

Precision Farming

Another field study on the Byron and Nate Weathers Farm near Yuma was initiated to characterize the variability of soil water and nitrogen over the field and their impact on corn yield. The focus is on monitoring soil moisture conditions and nitrogen sufficiency of the corn crop through the growing season and then relating water and nitrogen budget variability to variability in the yield data collected at harvest as well as the producer's yield maps.

Improving flow measurement

Accurate flow measurement is becoming much more important to producers and other water users who desire to more effective management of their water.

Precision Weed Management-Herbicide Degradation (Dale L. Shaner)

In the last two years, it was found that atrazine dissipated very rapidly in some fields but not in others. Experiments were designed to find out if field history of herbicide use affects degradation rate. Soils were collected from different fields in Yuma County with different field histories and lab degradation studies conducted with atrazine, acetochlor (Harness) and metolachlor (Dual).

Atrazine degradation was correlated to years of atrazine use. Acetochlor degraded quickly in all soils and metolachlor degraded the most slowly, but rates differed.

Other research is comparing herbicide behavior in conventional vs. strip till, developing methods to screen crops for injury due to glyphosate drift, and developing methods to screen field plants for resistance to glyphosate.

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The scientists…

Dale Shaner's research interests are divided into four categories which are: 1) Development of integrated weed management systems for dry land and irrigated agriculture to provide effective weed control while protecting water quality. 2) Development of cost effective methods to divide fields into herbicide management zones based on soil variability utilizing remote sensing and other types of instrumentation. 3) Determine relationship between weed management practices and selection and management of herbicide resistant weed populations and develop assays for detecting resistance in the field. 4) Explore new application technology to reduce pesticide drift while maintain efficiency.

Walter Bausch develops procedures for improving management decisions related to water and nitrogen use in irrigated agriculture. This includes techniques to improve estimates of crop water use for integration into efficient water management concepts, to develop procedures that can rapidly assess the plant nitrogen status for use in environmentally sound nitrogen management schemes, and to spatially define and evaluate the variability of these plant parameters in an irrigated field.

Gerald Buchleiter's research interests are in evaluating irrigation management options under limited water supplies to improve the irrigation systems. He also works with water measurements and develops irritation systems to reduce water quality degradation.

About Our Unit…

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The Water Management Research Unit in Fort Collins develops irrigation, agricultural chemical, and other management practices that protect water quality for all Americans while improving the husbandry of natural resources and the irrigator's economic viability. Research covers precision farming with center pivot sprinklers, remote sensing, and weed management for reduced applications of chemicals. Recent accomplishments include irrigation scheduling techniques for center pivots which result in estimated savings of 160 billion gallons of water annually; a weed management model that makes herbicide recommendations based on safety of the product and economics; center pivot remote controls that allow more precise control of irrigation and save labor; and a computer model that evaluates practices to minimize chemical leaching.